Notebook Series -- Notebooks by Edison
Notebook, N-19-12-06

This notebook is a continuation of N-19-11-04. It was used by Edison during the period December 1919-January 1920 in connection with his attempts to improve the plating solution used to make nickel-iron batteries, as well as the solution in the battery itself. Most of the entries describe numbered electrolytic and chemical preparations used in electroplating and contain notations regarding the condition of the plating on successive runs. Also included are descriptions and speculations relating to the electroplating processes involved in storage battery manufacture. A few entries pertain to the regeneration of old storage battery cells. The notes indicate that E. E. Dougherty and Sherwood T. (Sam) Moore assisted Edison and that matters concerning battery manufacture were brought to the attention of W. J. O'Dair at the Edison Storage Battery Co. The front cover is labeled "No 7 General Book Dec 6 1919." The pages are unnumbered. Approximately 100 pages have been used.

Dec 6/1919

1 Hour · 300 ma —

476 - 2 grms Ni acetate 250cc Cufree Ni SO4

Run

3 one edge up, not tough -
4 2 corners lifted - not very tough
5 good — 1 cor faint lift - tough, ok.
6 OK 1 Cor slight lift "
7 perfect
8 perfect
9 perfect
10 Has a few sharp points
11 "
12 Perfect 1 Corner up
13 Perfect
14 Perfect
15 perfect
16 perfect.
17 " 1 Cor up

CO

Dec 6 1919 300 ma 1 hour

477 – 250cc Cu free NiSO4 1 gm Acetic Acid

Run –

1 OK 1 cor up
2 "
3 sharp points 2 edges up – not Tough
4 No points not very tough 2 corners lifted
5 OK 1 cor lifted Tough OK
6 all right
7 Perfect except few sharp points, sticks to Cathode at point
8 Perfect " "
9 Perfect
10 Perfect 1 cor up
11 Perfect " ½ dog points
12 " 2 corners up slightly –
13 perfect 2 "
14 Perfect –
15 perfect 1 cor up
16 perfect 1 cor up
17 "
18 perfect.

CO

178 = 250cc Cupree Nitrate — 5 grms acetic acid

OK 2 Edges up.
OK but very thin & Tough
OK Thin + not very Tough but thicker than 2nd 2 Edges up
Side Crinched Corners lifted - not Tough
" Corners all lifted - not Tough
one Cor big turn up - not very tough
faint turn up 1 Cor - Tough
OK 2 Corners up
one end up
Good - 2 Cor bottom + Tops slightly up
Perfect 1 Cor slightly
Perfect 4 Cor "
Perfect 1 cor up
Perfect 2 "
perfect —
perfect 1 Cor turned up - usual
" 2 "
" 2 "
" 3 " not Tough thin
" 1 "
" 1 "
" 1 "
Perfect 1 —
" 1 Cor up

Cut Out

79 250 cc Cupree NiSoy — nothing added —

Run

1 Very bad — awful
2 OK 1 Cor up. sides imperfect.
3 OK 1 "
4 OK sides little rough — Tough Tough
5 OK no lift — Tough
6 OK 2 Cor lift slight
7 Perfect 1 cor lift faint
8 full of points, sharp, otherwise OK
9 " "
10 Perfect
11 Perfect
12 Perfect 3 corners slight lift.
13 Perfect 1 Corner "
14 bad top edge probably Sol too low otherwise OK
15 Perfect 2 Cor up top edge peeling nearly OK
16 perfect 1 Cor up much.
17 perfect —
18 perfect
19 perfect. few sharp points
20 perfect. no points —
21 " 1 lift no points
22 " 1 " large "
23 1 small —
24 Perfect
25 Perfect
26 " 1 Corner much up. Top
27 " 1 Cor small
28 " 1 "
29 Perfect
30 Perfect
31 perfect. little bad surface at extreme top
32 "
33 " 1 Cor 12 beads
34 1 Cor 5 beads
35 6 beads

80 – 250cc Cu free $NaSO_4$ 2 grms Ferric Acetate

Num

1 Very bad
2 OK
3 OK Thick Tough
4 OK 1 faint up 1 Cor – Tough
5 Perfect.
6 Perfect 1 faint lift Cor
7 Perfect
8 Perfect
9 Full of points – Very Bad –
10 Full of points Not Bad
11 perfect 1/2 doz points – Curls up when detached
12 OK Top peeled up.
13 Came off itself – 4 Cors replated.
14 OK Top edge bad peeling Sol too Low otherwise OK
15 perfect Top peeling not perfect.
16 perfect
17 perfect 3 Cor up
18 perfect 1 cor up small –
19 perfect 1 Cor up, large
20 " partly peeled
21 " 1 Cor slight
22 " 1 " some points
23 " " some points
24 " Cut Out

481 – 250 cc Cu from NaCy 2 gms Ferric Sulfate

Run	
1	Very bad
2	fair 1 cor up
3	fair, poor side edges – no turn ups
4	Sharp points, Twined up slight, 4 Cords fairly Tough
5	OK – no left – Tough
6	2 Cords up, slight
7	Perfect
8	"
9	"
10	1 Cor up slightly. Considerable points
11	perfect
12	perfect 1 Cor up – flat
13	" 2 " nearly flat –
14	" Top plating not good otherwise OK
15	perfect. 1 Core up considerably plating OK
16	perfect 3 cor up very slight
17	" 3 " "
18	perfect Whole Top ups
19	perfect. Whole of 1 side peeled away not very Tough
20	Perfect 1 cor left slight –
21	Perfect —
22	" 1 slight left – points
23	"
	Cut Out
24	perfect 1 Cor up big – Curled ups

506- 250cc Cu free, 1 Ferric, 4 grms Sulphate

Run

1 Like polished silver, thin brittle, cant strip
2 Comes off entirely - 2nd Coat, bright
3 nearly all peels off, brittle, Mirror like surface
4 bright - but all Cracked + peeled up in several rolls
5 Curled off, brittle,
6 " 2nd Coat, Rolled up, brittle.
7 whole self stripped, Curled - 2nd Coat on improving
8 Bad
9 Cracked but much improved, getting slight Matte
10 Stripped off Curled - no improvement
11 " "
12 Peeled - Considerable improvement
13 " - getting a Little matte, bottom Cracked
14. " intact, getting Matte
15 " " but split -
16 " " OK. not split, Much improved
17 " " OK peeled Easily Curled up 206
18 " " " "
19 " " " "
20 " " " "
21 " " " "
22 " " bottom peeled " 26 Gmds
23 " " " 46 Gmds
24 - Most peel 3 Corners up
25 - Self peeled 5 "
26 " 5
27 Top peeled 1/2 2 bot Cor smalle
28 3 small Corners
29 Top peeled 1 Cor bottom
30 peeled up bad Monday
31 3 Cors big 9 Gmds
32

Cg

507 250cc $CuFeEz$ $NiSO_4$ .4 grms Ferric acetal

Run	
1	OK-Tough
2	½ Curled up - away at bottom
3	Bottom loose, not Curled, not perfectly Tough
4	Perfect.
5	Bottom Curled up ½" otherwise OK
6	Perfect —
7	perfect 2 cors slight up
8	perfect —
9	perfect.
10	" 1 Cor

CO -

3 gm Ni Acetate Experiment

482 - 250 cc Cu free $NiSO_4$ 3 gr Ni Acetate 1 gm $CoSO_4$

Run	
1	Top + bottom peeked up some - Tough - OK
2	2 Corner lifted considerable - Tough
3	nearly curled up both Top + bot Tough
4	~~2~~ edge up fair plating
5	perfect one Corner up
6	perfect " slight
7	" 1 Corner up
8	1 "

Co —

3 gms Acet Ni Expt -

487 250cc Cu free Ni SO4 - 3 gr Ni Acet = 1 gm Alumn SO4

Plus

1 Dark — streaks straight up brittle Knife remove as a powder — NOTE!!

2 - Horrible —

3 Horrible —

4 — Horrible

5 Horrible -

6 Horrible

7 Horrible

8 Horrible but improving

9 Part OK but horrible still improving

10 Very much improved, I stripped it black

11 — Improved but black streaky - strip off

12 3/4 of it OK rest all OK'd improving

13 Almost Perfect - no lift — Tough, pretty

14 Perfect — Tough — !!

15 Perfect " | cor little up Tough

16 " | "

17 " — nearly self peeler

18 "

Cut Out -

Cupreous Nickel Sulfate

508 - 20 Milg dry Sulfate Alumina
+ 2 gms acetate Nickel

Run		
1	Cracked along both sides - Tough	
2 -	perfect -	Curled 1/2 off Tough
3	"	2 Corns slight, only faintly Tough
4	"	1 Cor up much Tough
5	"	2 "
8	Perfect	Tough
9	Perfect,	"
10	"	1 faint Cor up
11	"	
12	"	1 cor up bottom
13	"	1 Cor up bottom big
14	"	3 "
15	"	2 Cor top + bot
16	perfect	
17	perfect	
18	Perfect	
19	Perfect	
20	"	
21	"	
22	"	
23	"	

Cut Out

485 250 cc NaSO4 - 2 acetKi - 1 gram FerricSO4

Run

1 ½ Curled off, Edges fine cracks, not Tough
2 peeled off
3 OK 2 ~~[illegible]~~ Cor up Tough
4 fair 3 Corr up -
5 Curled up - Not very Tough
6 perfect. Top peeled $\frac{1}{8}$" not tough
7 " Top + bottom up Considerable
8 Curled up nearly all over frame cracks Cracked.
9 Curled away - left scarcely tor
~~10~~ Self peeled
10 tops big 4 Corrs
11 Self peeled
12 nearly self peeled
13 bottom turned up - Top 1 Cor
14 Perfect — points
15 " 2 Corr up
16 " 2 " slight
17

484 250 cc $NiSO_4$ – 3 gm acetic acid 1 gm $CuSO_4$

Run

1 Very bright fine Edge cracks Copper color?
2 flat but warts & cracks not bad No Cu Color
3 black flocculent warts streaks thin
4 black " " Streaks Cu Color Tough & slight
5 " " " " No improvement
6 " " getting worse??
7 " " Still bad
8 " " Awful bad green
9 "
10 " — no bubbles
11 " No improvement
12 " Worst yet — Horrible
13 " Bad yet
14 " Still bad
15 " Awful —
16 " Bad
17 Better —
18 " — Bad
19 much better
20 Worse
21 6 Gmds — only few black streaks
22 bad yet
23 bad
24 "
25 " improved
26 bad again
27 bad
28 bad
29 bad
30

Cut Out

483 - 250cc Mbaq - 3gm Acetal Ni 1gm Zn SO4

Run	
1	Came off self - not tough, Mirror bright
2	1 layer peeled
3	Mirror - all bad Brilliant "
4	nearly whole - Brilliant Mirror self peeled
5	" not so Brilliant improving
6	Intact but all fine Cracks
7	" streaks - getting bad, Mirror [illegible]
8	Curled & Cracked peeled, fine Mirror not improving
9	" " "
10	" " "
11	" " "
12	" " "
13	" " "
14	" " improving slight
15	" " Much improved
16	Self peeled, intact except at heavy bottom hole no d, fairly tough, Same Mirror
17	About same - Mirror
18	Improved. stopped at nearly intact
19	Same as 18
20	about Same
21	nearly intact. 2 bands Mirror
22	Intact Mirror
23	" " holes
24	" "
25	nearly intact
26	Completely intact, holes + streaks
27	getting matte 6 bands
28	2 Cor up has holes (bubbles) - getting matte
29	bad

CO -

488 250cc $NiSO_4$ 3 grms dect Ni 1 grm $MgSO_4$

Run			
1	self shapped		
2	4 Cors up	much	Tough
3	3	"	"
4	2	"	"
5	2	"	
6	1 Cor up	slight	"
7	Perfect	few sharp points	
8	one whole side Curled	"	2 Cors up
9	all 4 cors Rolled Concave		
10	self shapped Curled - puffed on		
12	1/8" of Top up		
13	1 Cor up -		
14	Perfect		
15	"	1 corner	
16	"	1 Cor	
17	"	1 Cor	
18	"		
19	"	2 Cor up slight	
20	"	sharp points	
21	"	few " "	9 Ends

y 89 25 Dec 1904 – 3 grms Acetate Ni 1 grm Ammonia SO_4

Run	
1	self stripped – fair
2	Cracked around all on Cathode brittle
3	" "
4	self peeled "
5	Intact but Cracked at Edge brittle
6	2 Cor lifted much not tough
7	4 Edges up not tough
8	all Crack on sides
9	all peeled from sides nearly
10	Cracked Edges, lifts brittle
11	" " "
12	" " "
13	" " "
14	Cracked at Top only at sides
15	" " " " brittle
16	perfect Top 2 Cor up smooth
17	Sides Curled up — 2 Bends
18	"
19	Top 1/3 peeled up 1 bottom Cor bag up
20	3 Cor up Cracked sides 2 bends
21	2 "

491 - 250cc Nutsoy Cultura 1 gm Cerous Sulfate

Run			
1	PERFECT	Tough - no edges up.	
2	Perfect	"	
3	"	1 cor up	
4	"	3 "	
5	"	1 " big	
6	"	2 Tap Cor up much	
7	"	3 Cor up -	fine Color
8	"	1 cor	
9	"	1 Cor	
10	"		
11	"		
12	"	1 Corner faint	
13	"		
14	"	1 Cor up	
15	"	1 Cor up	28 beads
16	"		10 beads
17	"		Very white.
18		1 Cor	" 10 beads
19	"		"
20	Perfect		"
21	"		
22	"		

Cut out,

09 - 250 cc Cupric N_1SO_4 - ½ gm $Al_2(SO_4)_3$

Run

1 — phenomenon — mass of little balls — scrapes off to a powder by knife —

2nd dark — scrapes off in powder

3 " " no improvement

4 " " "

5 " " but great improvement

6 " improving

7 " " "

8 " " " scrapes off easy

9 " " Hard to scrape off still improving

10 Bad again

11 " " Not good

12 "

13 " not good

14 Bad

15 Bad

16 Bad

17 "

18 "

19 "

20 "

21 Hopelessly Bad

22 —

CO —

493 250 cc H_2SO_4 1 gm Manganous SO_4

Run nearly self chipped, Curled, not tough.

1
2 2 Cons up Tough
3 Tops curled up - 1/8" of Tops left Evenly
4 4 Cons up
5 3 "
6 Top & bottom ups a little.
7 " + 3 Cons Long
8 2 Cons Top, much
9 perfect
10 " " 2 Cons up
11 " 2 "
12 " 2 "
13 " 1 "
14 " 1 "
15 1 "
16 1 " 7 Bends

CD

Sample from 10 Bad A6 — 135 amp H
Regenerated in 12 hours —
Sent to Bat Co Dec 10/19 for test. — 1233 both cells on 3rd
Run this is even better than
Current regular M. (OH) —

We find that the reduction is quicker & more even when 20% NaOH is used with glucose than when 10% NaOH is used

90. 250cc NaOH — 1 gm Cadmium Sulfate -

Run

1 — Black warts, cant strip

2 " " not as bad

3 " " just as bad

4 " Lumpy, gelatin cant strip

5 — Zinc color " peeled — Cinnabar color / brittle

6 " "

7 All peeled, warts gone — Zinc Color

8 Cracked — black around Edges Bad

9 all Cracked, Color Zn Like

10 " "

Cut Out

511 Continued -

2R perfect 1 Cor up

75' 22 " Thin

8

Cg

511 — Cu first Nebsy big crack — Alright taken out by Ba Boy [illegible]

Run

1 - ok but Curled up, tough - not very tough

2 Perfect 1 Cor up -

3 Curled up from sides not tough
Come loose early

4 2 Corners, Curls 3 bends fair

5 2 Cors up 3 bends -

Think 511 + 510, small work ok for gall on 5th - 511 best.

6 Perfect — Soft Tough

7 " 3 Corners up - Cracked 2 bends

8 3 " 2 bends

9 Perfect — ok gall 2 bends

10 " 1 Cor up — 3 bends

11 2 Cor up 1

12 Perfect —

12 Perfect —

13 " 2 Cor up

14 " 1 Cor

15 "

16 " 4 Cors up

17 " 1 small Cor

17 S. Poor 3 Cor up 2 bad Monday

18 ok 2 Cor 1 big

19 Perfect —

20 perfect —

21 " 2 Cor up - cold

22

See Boughley

This is said in big Creek record

510 - from big bath Cu —

Run

1 - All cracked terribly & brittle

2 " " "

3 fair - turned up at 4 Cors down improving fairly tough -

4 - 2 Cor up Cks on 1 side 1/4 " 3 cks - 5 bends

5 2 Top Corrs up 3 bends -

6 bottom peeled - 2 Cracks at top

7 4 Cors up - tender land Curve up broke 1st Bend -

8 3 Cor up 3 bends

9 1 Cor big 4 bends

all 10 Perfect - 2 Cors 3 bends

11 " 3 Cors

12 " 1 Cor

13 " 3 Cor up -

14 " 2 Cor very faint -

15 " 3 Cor up

16 OK

17 " good - but 3 Cor up little Moldy

18 " 2 Cor small -

19 " 1 Cor fine -

20 " 2 Cor up

21 " 3 Cor 1 big

22 " 2 Cors small -

23 " "

24 " 2 " thin

25 "

26 "

27 "

Processing

512 - Cut out big sol. neutralized

Run

1 Cracked slightly like saw along 2 edges. 1 Cor left much promising for 1st Run fairly large, 4 bends -

2 1 side curled up - other top Cor curled than usual, soft - 12 bends - Thicker

3 4 Corners Curled up big 2 bends

4 4 Corns up - Cracked 3 bends

5 4 Corners Sides peeled up 5 bends

6 2 Cor - 3 Cracks in Top -

7 Perfect 2 Top Edges up

8 " 2 Quite Tops 4 bends

9 " 2 Cors 1 crack dull

10 " 1 Cor up big

11 " 1 Cor up - after gall - 5 bends

12 " 2 Cors up 1 bad

13 " 1 Cor small -

14 " Crack - peeled bad, monday

15 " 2 Cor big 1 Cracked

16 " 5 Bends

17 " 2 Cor up small

18 " " large

19 1 Cor up big

20 " small

21 2 " up

23 14 " 2 Cor

CO -

511 Dup — Same as 511 but Peroxide
Boiled off —
Run

1 Cracked top Curled up Trough
Curled Early 5 Beads

2 4 Corners up. Cracked 4 Beads
3 " " "
5 1 Cor up — 3 Beads
6 3 Cor up · Crack at top 5 Beads
8 perfect. 2 Cor up
9 " 2 Cor up Off forgot 10 Beads
11 " 3 Cor up —
12 " 1 Cor small
13 2 Cors large 1 small monday
14 " 2 Cor up.
15 " 1 Cor up big
16 1 3 Cor up
17 1 4 Cor — change powders
18 2 Cor "
19 1 2 Cor 2 up "
21 1 2 " no powder
22 1
23 "
24 1 Cor up

513 - Dougherty

1st	whole top peeled 1/2		6 Gentle
2	4 Corners big		4 [illegible]
3	4 " big		
4	3 " big		
5	perfect	3 Cor up 1 big	
6	"	3 Cor up small	Obliqs
7	"	2 Cor. considerable	
8		1 Cor. "	
9	Poor	badly peeled & cracked Monday	
10	"	"	"
11	fair	1 Cor. 1 Crack brittle very Thin	
12	Poor	2 Cor 2 Cracks on sides	
13	fair -	4 Cor up 1 Crack	
14	"	"	Second Crack
15	Perfect	2 Cor big Thin,	
16	"	2 " big	
17	"	2 Cor up	
18		2 Cor	Thin
19		2 Cor	V Thin
20		2 Cor 1 big	Cracked sides
21			

514 Doughlin

1st 2 Cor big peel up 3 bends

2 " peeled entirely from Endpoint in C Cor 3 bends

3 nearly all Curled, late

4 perfect 2 Cor up at top considerable

5 " 4 Cor up

6 " 3 Cor up 2 big

7 " 3 Cor, sides peel up some 1 sid

8 3 Cor otherwise OK ✓

9 Poor peeled + cracked Monday

10 " "

11 perfect 1 Cor big lip (thin) - 3 bends

12 " 4 Cor up small

13 "

14 " puffs up — no Cor

15 2 Cors no puff up

16 3 Cors Cracked 2 places

17 4 Cor up

18 blisters 1 Cor

19 quite thin

20

21

22

Dec 13/19

Moore Regeneration #413
using 20% NaOH,

$Ni(OH)_2$ green

Edison #3 sent Dec 13 to
O'Neill for test.

501 250cc Cu out - 3 Mlg Mercurious SO4

1st Cracked up terribly

2 Edges all around bad

3 puffs - 2 Cor big 8 bands

4 Perfect 1 Cor up 7 bands

5 blisters 3 Cor up

6 Perfect 2 Corners

7 " 1 Cor

8 " 2 Top Cor

9 "

10 " 1 Cor up

11 2 Cor up

12 1 Cor up thin

13 2 Cor up

14

15

505 Cwt free 1 lb 04 5 lb 1/4 Ag 8 04

1 Cracked up terribly
2 fours - 4 beads but bad at edges
3 perfect. 1 cor. 7 beads
4 " 1 Cor up big
5 " 1 Cor up big 8 beads
6 " 2 Cors 2 or 3 points
7 1 Cor up
8 " sharp points
9 " 1 Cor up big
10 2 Cor up big
11 puffed blisters 1 ends turned up
12 2 Cor up no blisters thick
13 1 Cor up. ~~[illegible]~~
14
15

Ni Solutions of all kinds seem to want 60 amp hours of Nickel plated hours per gallon of solution before they are tough + flexible —

300 gals requires 18000 amp hours requires 105 baths running 24 hours - probably 75 baths 2 hours would answer when sol was nearly OK — 7½ Cu out No 8/4 + Ni plated + saved to be plated on again changed sol produce brittle veneers at future times 75 disc thus could be used as cleaners permanently —

15 Bug Crack 250cc Cultre = 1hr 04
1 gram glucose
= Sh. ripped nearly in family Eaten by 3rd Ward
2 Curled up Cracked
3 " "
4 " "
5 " "
6 " "
7 " "
8 " "
9 " "
10 " " improving
11 " " "
12 " "
13 " "

516 - Big Creek Cutfree, MS04 -
10 cc mg dip 8/4

1 = Horrible all cracked up + yellow
2 Slight improvement
3 Still horrible -
4 " "
5 " "
6 " "
7 " "
8 " "
9 " " improving
10 " " improving more
11 " " " V brittle
12 Cracked up - improving
13 Still Ck'd - improving 1 Minor 2 Crack Minor
14 1/2 dog Cks Very much improved
15 OK Except 1 ck at top Cor
Very brittle, tears in stripping 26
16 OK - 3 Cor up 2 big - Middle
16 5 Cracked - Edges up big 4 Cracks
17 Top peeled up Matte Springy
18 " "
19 2 top Cors -
20 3 Cors - thin 1 Crack
21 3 " 1 big
22 2 up - big - Curled
23 2 "
24

Co

517 - Big Crock Cedrus atlantica - Hi Sog
10 gram plate chest.

1 = Stripped very early, brittle.
2 much improved
3 Improved 4 Cor 1 very Cramp
4 " Cracked 1/4 peeled
5 - Nearly OK 2 Cor big 1 small 2nd bad
6 " 4 Cornu
7 All cracked up very bad
8 "
9 " improving
10 3 Cor up by slight peel 1 side 3 end
11 Cracked stick
12 good. Top peeled little
13 perfect
14 - 4 Cors up - 4 Bend
73° 15 2 Cor top up
17 2 Cor Cracked at top then
18 2 " big
19 3 Cor small - 1 bend
20 3 1 very big 2 small -
21 3 Cor 2 big.
22 4 Cor all big
3° 23 2 1 big
4° 24 2 up

CO

Reg NiSO4 Conc + crystalized - Crystals drained in filter pump, washed Cold water, redissolved in distilled H2O to sp g 1.29 at 24° - filtered

518 Dougherty's CP NiSO4 - Everything out

1st Horrible all Cracked in thousand pieces
Red Edges — anode Red
2 Improved - Red Edges
3 Perfect ——— 3rd Gen
4 " 1 Cor up - points, gas holes
This is all full gas holes like a sieve
5 Perfect ——— 2nd Gen
6 " ——— 4 Gen
7 " 2 Cor ups thin 2 bends
8 2 " faint 12 Gends
9 " ——— blisters
10 ——— "none"
11 ——— 8 bends. thin
12 ———
13 ———

519 Continued

~~5th~~

20th 3 Cors 1 1/2"

21 2 " 1 big

22 1 up big

C_2O_2

519 – Cupree big BaS – Fe oxidized by BaO2 (very small amount)
free acetic acid neutralized by very large amount of fresh
$Fe_2(OH)_6$. left small amount
free acetic in Electrolyte Specif 1265
Room temp

Run 1 3 Cor + Cled good for 1st run
2 Sides peeled up 1/8 @ 1/4 – Check
3 1 Side peeled up a little. improving
seems quite Check 2 Bends

4th – peeled + Cracked
5 "
6 "
7 2 Cors big – improving fast thin
8 – Cracked + Side 1 big Cor
9
10
11 2 Cors 3 Bends
12 2 "
13 3 Cors + big –
14 1 Cor up thin
15 2 Cor up
16 1 Cor, Umbrellate
17 1 Cor big
18 3 Cor
19 3 Cor – 2 very big Curled

93 – 2 Cor Sieve

29 – perfect — Sieve
30 " no holes
31 " "
32 — flat No holes few points
33 " "
34
35 76°
36 80° Sieve
37 – 70° No holes points 15 Beads
38 70 "
39 "
41 OK
40 Sieve
42 OK
43 1 Hole
44 OK
45 Several holes
46 OK
48 Sieve only on Hard point
49 OK
50 OK. defect holes
51
52 OK
53
54 OK
55
56 OK
57 OK

24 hours 3 o-o

58 OK thick
59 3 Cor "
60 1 Cor "
61 OK "
62 OK "

63 OK
64 all Sieve
65 OK
66 OK
67 OK 1 hole flat
68 OK
69 OK 2 holes
70 OK
71 Sieve
72 "
73 1 cor by Sieve
74 OK
75 OK
76 defect
77 OK
78 OK
79 OK
80 Sieve
81 OK
82 OK
83 OK
84 OK
85 OK
86 OK
87 OK
88 OK
89 OK
90 OK
91 OK
92 OK

520 Doughlery CP Recrystallized Nov 4 once
No addition

Run
1 All cracked up.
2 2 Cors 1 big Nearly OK 15 beads
3 1 faint Cor 20 beads
4
5
6 1 faint Corner 12 beads
7 94 OK 5
8 95 OK Thin
9 96 Sieve
10 97 OK
11 98 OK
12 99 OK 3 Beads
13 100 OK
14 10 "
15
16
17
18
19 35 beads
20
21
22
23
24 200 much holes
25
26
27
28 35 small no holes

Continued

521
25 — perfect flat
26 "
27 "
28 " no holes — better than 30 bad
29 Sieve full holes
30 " 1 hole
31 1 hole
32 no holes
33
34 75.7 no hole
35 77 "
36 80 "
37 70 — no holes
38 "
39 — 2 holes
40 OK
41 OK
42 OK
43 OK 1 hole
44 OK OK
45 115 OK
46 OK 1 hole
47 OK 35 bends
48 OK
49 OK
50 OK
51 OK
52 OK

74 = 2 Cor up 1
75 OK
77 OK
78 Sieve
79 OK
80 OK
81 Sieve
82 OK
83 OK
84 OK
85 OK
86 OK
87 OK 78
88 OK
89 OK
90 OK
91 OK
92 Sieve
93 OK
94 OK
95 OK
96 OK
97 OK
98 OK
99 Sieve
100 OK

53 — OK
54 5 — OK
56 — OK
57 — OK
2 Hours 300 M

58 OK 1 hole
59 3 Cor. "
60 OK flat
61 " "
62 " " 1 hole
63 " "
64 Sieve
65 Sieve
66 OK
67 Sieve on green
68 OK
69 OK Shaken 2 hr
70 OK
71 OK
72 OK
73 2 Cor OK
74 1 Cor OK

521 - Same as 520 added 1 cc
Acetic Acid —

Run
1 — perfect - 3 Cor up 2 bad 4 bends very thick
2 " 1 Cor up liq mod thing 9 bends
3 " 1 Cor up - small C 17 bends
4 " blisters
5 " 7 bends thin
6
7 " 4 bends
8
9
10
11 with tight & nolico full holes
12 3 bends 15 ft not pulled
13 few gas holes thin.
14 nearly flat
15 2 bubbles
16 3 "
17
18 lots points — full of gas holes
19 Phenomenon just like a 200 mesh sieve
Think it must be very even
holes are due to attack + disolving +
not to any gas bubbles
20 only 1 or 2 holes 1 Cor up
21 points 12 bends
22
23 points 40 "
24 no holes 36 "

522 Dougherty – Mother Liquor SG 1.295
from Crystallizing CP (alleged NaSO4) 1 collectic
1 = Horrible Cracked up
2 Impressed partly chipped
Cracked, pit, Eclipse
3 = 2 Cor big ½" turned up (or curled up)
but generally OK curled Entirely 2nd Bend
4 good 1 Cor 2 bend
5 2 Cors up big
6 1 cor up big 2 bend
7 2 Cors up 1 big
8 2 Cors 2 big 1 bend
9 2 Cors up
10 3 "
11 4 1 very big not flat
12 4 up small Curls only little
13 2 = 1 big "
14 OK –
15

CO.

Regeneration -

100 lbs anode mix from Luters

yields

Nickel hydrox	51 lbs
flake over 40 mesh	3
" fines -	4.7
Ni Sulfate -	6.5
	8.8 %

Sludge

which contains -

7.3 lbs Ni (OH) -

1.5 Fe (OH) 3

494 240 cc Cu free 1 gm Stannous Soy

1st - 2 ~~Edge~~ Cors big -

2 OK 2 Cor up big

3 perfect 2 Cor big somewhat 3 [illegible]

4 " 2 Cor very big 5

5 " bottom up 1/3 14 not pulled

6 2 Cor Curled Consumable

7 2 " Crooked

8 bottom up -

9 - 1 Cor - but -

CD.

496 250cc Cupfuls, 10 Milg Arsenious acid

1st all cracked horrible

2 3 Cor – cracked slightly

3 perfect 3 tiny Cors | 3 brand

70° 4 2 Cor 1 big

5 2 " small

6 2 Cor Curled a little

7 2 " 1 big — flat 4 brand

8 1

9

10

CO

499 – 250cc Cu free 10 Mily Calcium SO4

1st Cracked a edges 1 under 6st rest OK

2 Cor up 6 bends

71° 3 Perfect 1 cor v small 1st Bend

70° 4 1 " 8 "

5 1 surface fine 1 at 30 bends or more not pulled

6 3 cor early dry warts – 2 Cor big Curled little

7 4 Cor 1 big 1 bend

8 2 Cor

9 OK

CO

500 2000cc Coupee 2 Melg dead Dog

1st	all Cracked up Lad		
2	perfect	1 corr up small	3 Gends
3	"	3 tiny Corrs	2 Gends
4		2 Corrs	4
5		3 Corrs up just barely thick	12 not pulled
6		2 Corr	Curled
7		2 Corr	nearly flat
8			
9			

CO

Continued 523

28
29
30 Sieves
31 OK
32 OK
33 OK
34 OK
35 OK 3 holes
36 OK
37 OK 1 hole
38 OK 24 bends
39 OK
40 OK
41
42 OK
43
44 OK — full holes
45 OK
46 OK
47 OK
48 OK some holes, 1/4 slip thick-clear

40 bends
73 OK
74 OK
75 OK
76 OK
77 OK warm
78 OK
79 OK
80 OK
81 OK
82 OK Thick
83 Sieve
84 OK
85 Sieve
86 OK
87 OK Clear
88 Sieve

4 2 Hours 300 MA

49 Thick some phenomenon at Top
50 OK - Thick
51 OK " dead float
52 OK " "
53 OK " "
54 Sieve
55 Sieve
56 Sieve
57 OK
58 OK 1 hole
59 OK
60 OK
61 OK
60 OK — thick

61 - OK
62 Sieve
63 OK
64 OK
64 OK blisters
66 OK
67 OK
68 OK
69 Sieve
70 OK
71 OK
72 OK

523 250 cc CP $NaOH$ (twice recrystalized)
glacial = 1 cc Acetic Acid -

1st PERFECT — Bendo 30 Times
2nd " " "
3 "
4 bendo 20 or more of not pulled
5 few holes Curled — little
6 no holes
7 1 hole
8 no hole
9
10 1 cor 11 bends
11 Phenomenon 200 mesh like Eaton.
12 " same thing
13 only few holes — 13 Bends
14 OK no holes
15 1 cor no holes
16
17
18
19 several holes 30 bends
20 no holes
21 1 or 2 holes
22 1 Hole
23 no holes
24 full holes Sieve
25
26 no holes - some pounds
27 no hole or pounds

497. 250 cc NrSoy Cultura no acetic
10 mg - chromic acid

1st Run — All Cracked up

2 — ok but bad have cracked Edges 25 bend
Thick platelets at bottom thin at top —

3 — ok. — bottom up a little Tough

4 — ok — Top up 2 1 by Very Tough

5 — " — 2 Cor 1 hole

6 — " — 2 Cor 1 hole. 4 bend

7 — " — 1 Cor up

8 — " — 2 Cor up

9 — " — perfect — points

10 — perfect. no points 7 bend

11

CO —

525 From Galls beg Crock 2 qr ferric hydrox

1 - Curled up bottom & top
2 " Sides Evenly
3 "
4 " 1 Cor beg - Cracked sides 4 beaved
5 - " ~~Cracked~~
6 3 Cor 1 Ck - 1 Cor peeled
7 " full Eatin holes -
8 2 Cor up - Reg Seirs 200 mes

CO

524 – 250 cc from 4 lb big crock 2 g boric form
of calcite

1 = Curled + left Cathode – 2 only
2 only little Curled but C'd both Edges 8 + 4 g
3 Curled + Cracked 12 Gram
4 perfect — 4 Gram
5 1 Cat – 200 Mesh Sieve
6 Cracked + peeled no luster
6 – "
7 2 Cons
8 Perfect
C.O.

526 Mother Liquors from 5214 523
boiled down & Crystallized Crystals
made up to 1250 cc Sp G 1.255 —
1 cc acetic — Not mother liquor but extra
Crystals from mother

1*	4 Corn up 2 bag		9 Grams
2	perfect, 1 Corners		15 Grams
3	"		
4	"		
5	"	Calin. grooves separate with Thumb	
6	"		O/C no holes flat 13
7	"		full holes
8	"		full holes
9	points		no holes
10	no points		1 hole
11	points		no hole
12	" few		1 Hole
13	"		no hole 1 fourth
14	none		"

CD

527 = 2500 W/Soy Cu free 20 mlg
Telluric Oxide from Baltimore

1 = All Cracked & peeled
2 Much improved Cracked | 26 Grams Eclipse 4 to 5"
3 Nearly perfect Very few Cracks or no Eclipse 15 Grams
4 Still more perfect Top up 1/12 no holes
5 perfect, 2 Cor small 6 Grams
6 " 2 Cor up Top – 1 hole
7 full isolated holes
8 — no holes 6 Grams
9 — " 12 "
10 4 Cor up small
11 3 " "
12 Whole top 1/2 up
13 2 Cor up

CO

504 $MnSO_4$ Cu free 10 Mlq Thallium SO_4

1 – Cracked up

2 Much unpressed

3 1 Cor up big 200 Mesh Sicor

4 flattened 1 Cor –

5 " Flat no points or holes 6 bends

6 " flat – no holes or points Thick Tough Cor " bends

7 " 2 Cor up — bent few holes

8 2 " Sierra

11 – 1 Cor up no holes

CO

502. NaSoy Cu free 3 mlq Platinic SO4

1	Horrible		
2	90% OK	78° Fah	18 bends
3	perfect		6 bends
4	"		5 "
5	"	flat.	13 "
6		2 cor flat	21 "
7		many holes	
8	dead flat no holes thick		
9			
10		2 Cor up	
11	OK	1 cor up	
12	OK		
13	OK	3 Cor up	

Co

486 – Mt204 Cu free 1gm ferric sulfate

1 all cracked up
80° 2 " peeled up but intact, peeled [illegible] 7 days
75 3 OK 3 Cor 1 hole
80° 4 Self peeled ⓪ Sieve
70 5 1 Cor V bug
6 3 Cor 1 bff
7 1/2 peeled
8 1/4 "
9 3 Cor bug
10 4 Cor cups bug

CO ?
CO

528 - 3rd Recrystallization 80°7 no acetic

1st. Sides turned up 1/16 bottom peaked up 12 bends
1/16 -

2nd perfect — top slight up 34 bends
3 " flat — 38, 40
4 5 " flat -
5 "
6 — two holes
7 OK 1 hole
8 OK
9 OK 28 bends

CD

495 – Nelson Cu free 1 grandson left

1 = Cracked up not bad

2 4 Cor up 4 beside

3 3 "

4 OK flat

5 OK "

6 Top up bottle

Co

498 – McBoy Cupren 5 Mil (gal)

1 bad cracked

2 ~~perfect~~ 2 edge up curl of Cat 46

3 nearly " 4 " up

4 Sieve bad

5 OK

6 OK but edges not perfect at lip

7 OK " " round

8 CO

492 McCoy Cupreous 1 gram Chromous
50¢

1 = OK except 1/16 of Edge apparently bad 3 times
2 Improved - flat 17
~~3~~ OK no Comments 24 bad
4 OK = few holes
5 OK Edge not quite OK yet
6 OK " " Curous
7 OK " " 4 bewares
8 OK " " "
9 OK " "
10 — Very bad - deep [illegible]
11 — 2 cor 3 Holes Edge little bad
12 Several holes
13 — black at bottom
14 All green

C O —

28 = 1/2 dropped V thin
29 8/10 " V thin
30 ok - few holes thin
31 Sieve
32 OK
33 OK
34 OK
35 OK
36 OK
37 OK thin semi
38 OK "
39 OK
40 OK
41 Sieve
42 OK
43 OK ~~[illegible]~~ in air
44 OK
45 OK fairly thick
46 Sieve
47 Sieve
48 OK thin
49 OK med thin
50 OK "
51 OK
52 Sieve
53 OK

CO

Electrolytic Anode

529 — 250 ml soy 2nd Crystallin, 7 g of Cu out
Electrolytic Anode

1st. All peeled up + cracked
2 OK — Sieve 4 bends
3 OK
4 OK 18 "
5 OK Very fine grain, no cupolas
6 OK Sieve
7 OK Very thin -
8 OK "
9 OK Very thin cant strip 10 hole, bridge wall, delaminate
10 OK " 9/10th strip [illegible]

2 Hours 300 ma

11 OK thin -
12 1 Cor up thin strips ok but thin
13 OK — thin "
14 OK " few holes
15 OK " "
16 OK cant strip
17 Cant strip. only little Sieve
18 Strips OK 1 hole - thin -
19 Sieve —
20 OK no holes thin
21 OK 2 holes thin
22 9/10 strip 2 holes "
23 OK strip OK 1 hole "
24 Sieve
25 Cant strips
26 Cant strip
27 " Seems circular anode = 3

Note 529 – 530 bath.
Electrolytic anodes bath
gives Sieves 26th Dec in morning
behaves as old anodes. Same
time gives OK deposits –
What Connection ? ? SS

530 - 250 cc $NiSO_4$ 2nd Crystals at Cu Fe out
Electrolytic Anode 1 cc Acetic acid

1 = OK. 2 small Cor. up 12 bends
2 Sieve fully
3 OK
4 OK
5 Sieve
6 Very Thin – hard to strip
7 OK Very Thin
8 OK Very Very Thin – "
9 OK Thin
10 OK blistered

Electrolytic anodes gives much thinner deposit.

~~2 Hours 300 ma~~

11 OK
12 Sieve on minute Thin
13 some holes about 1/3 right thick
14 " " "
15
16 " " 1/4 "
16 Cant strip
17 Strips OK Thin 2 holes
18 Cant strip –
19 Stripped Sieve
20 8/10 Stripped – 5 holes Thin
21 OK – several holes
22 OK – "
23 Cant strip several holes
24 Strips OK no holes

CO

31 Same as 530 only using old anodes —
1st 1 Cor big
2 OK —
3 OK quad
4 OK 9 bends
5 OK
6 OK — points 6 "
7 OK Reg thickness 1 hour 300 MA.
~~2 Hours 300~~
8 OK OK —
9 4 Cors up 1 big thick
10 2 " very faint flex
11 OK
12 OK thick —
13 OK " several varying holes
14 OK " 1 hole
15 Sieve
16 OK
17 OK
18 Sieve
19 OK
20 OK - blister, thick
21 OK thick
22 Sieve,
23 1 Cor — Sieve thick
24 OK
25 2 Cor OK
26 OK
27 OK
28 OK
29 Sieve
30 Sieve
31 OK

32 OK
33 OK
34 Sieve
35 OK
36 OK
37 —
38 OK thick
39 OK "
40 Sieve
41 OK
42 Sieve
43 OK
44 OK thick
45 OK Mod thick
46 OK "
47 OK
48 OK full holes ~~Good up to 6~~
49 OK
50 OK
51 OK - 1 Cor
52 OK
53 OK
54 OK
55 4 Hours 300 MA
55 OK nearly flat, 2 Cor small
56 OK flat
57 Sieve
58 OK
59 OK
60 OK
61 OK

Dec 26/19

Regeneration of Old SB Cell mix
The 20% Sol with glucose cant be
used again as it gets thick & sluggish
We will Evap down & bring it
up in temp to burn out the
Organic Matter —

~~32~~ 11 — ok Thin - spongy
12 — 1/2 strip
13 ok Curls thin
14 Sieve
15 ok V Thin
16 ok
17 ok Curls, ~~[illegible]~~ "
18 — ok " " "

Now put Electro, ignited anode in fresh 2 Crystal sol —

1 = Cracked up
2 ok flat, ~~[illegible]~~ Thick - 2 cor slight
3 Sieve
4 ok Thin —
5 ok "
6 ok "
7 ok "
8 ok " holes
9 torn "
10 ok —
11 ok

CO —

532 Nibs - 2 Crystals 1 cc #2 504
Electrolytic Anode

1 = Very thin - had to strip 1 hour 300 ma
2 Hours 300 ma
2 stripped ok - about as thick as Reg 1 hour
3 ok Sieve on bracket part
4 ok no holes Thin
5 ok Some holes, Thin, piece stuck
6 ok 1 hole "
7 ok Several holes Thin
8 ok " "
9 ok
10 ok torn little in stripping - thin
11 ok 3 or 4 holes
11 ok 1 hole, blisters V Thick
12 Sieve
13 8/10 stripped ~~[illegible]~~ holes V Thin
14 Sieve 1/2 strip —
15 ok 3/4 strip

Will now neutralize Completely

after Neutralized —

1 = all cracked up —
2 4 cor up all Sieve Thick
3 ok 2 cor up
4 ok blisters
5 ok ~~thin~~ fairly thick
6 ok pretty thin
7 ok
8 8/10 stripped
9 ok 8/10 stripped
10

~~S1 H2~~

133 Nisoy 2 Crystals 3 cc H_2SO_4
Electrolytic Anode

1st Can strip only 1/2 = Very thin. 1 hour 300 Ma
2 Torz no stripping 2 Hours Very thin
4 OK several holes! Very thin 1/4 Thin
5 only 1/2 stripped
6 " 3/4 " Sieve
7 Torz - very thin. 2 holes
8 " " 2 "
9 Cant strip
10 stripped 8/10th - Spongy
11 1/2 stripped / Sieve
12 OK
13 Put platinum Chl on cathode —
darkened cathode, coulstat peal
14 Cant strip Very Cleaning
15 " " " "

CO

24 1/2 strip —
27 2/3 strip
28 1/2 strip thin
OK thin
29 8/10 "
30 OK "
32 OK " Curls
33 OK " "
34 Sieve

Put unignited Electro Anode into fresh 2 Cryst Sol.

1 = Cracked up
2 OK. 2 Cor slight thick.
3 OK —
4 OK mod thin —
5 1/2, Sieve thin
6 1/4 strip, thin
7 1/2 " "
8 OK V thin
9 Sieve
10 OK — V thin

CO

534 N Soy. 2 Cryst 6 cc H_2SO_4
Electrolytic Anode
1st Too thin to strip — 1 hour 300 MA
2 Hours 300 MA

2nd just managed to strip 5% Very V thin
3 Cant strip too thin —
4 "
5 OK. Thick — Strips Reg. Thin
Solution Green neutralized so dilution barely red — Cores OK —
6 — Sieve not reg thick
7 1 Cor up. Holes, 2 or 3 holes
8 Sieve thin
9 OK 1 hole Very thin — Thesis 156 Ends
Curious —
10 OK 4 holes Thin
11 OK 1 " "
12 OK 1 " "
13 OK 1 "
14 Cant strip, Sieve
15 OK 1 hole thin
16 Cant strip — Sieve
17 stripped many holes
18 " 3/4 — thin
20 3/4 — "
21 Cant strip
22 OK
23 OK
24 OK. Curls
25 OK "

~~1 Hour 300 MA~~

535 N Soy 2 Crystn 12CC H_2SO_4
Electrolytic Anode
1st Too thin to strip — 1 Hour 300 MA.

2 Hours 300 ma

2 plated but too thin to strip only a brush
3 Cant strip VVV Thin
4 Covered o.k. but too thin to strip
5 Plated but Cant strip
This was an old anode
6 Cant strip —
7 "
8 "
9 "
10 Stripped 1/2 Exceedingly thin no holes
11 Cant strip —
12 "
13 1/2 stripped

Trying 600 MA density
after several hours it plates
thick but think it not
very good no holes seen
but evidence next 5/4 seems
poor & its full of powder

CO

Dec 27/1919

Phenomenon

With an almost saturated solution of pure NiSO4 - The thickness of the deposit seems to be contracted by the efficiency of the anode. One would think that there was plenty of Ni in the solution even if Anode was only slightly attacked to plate out regular thickness. But it dont act that way. I use 300 MA on 2 square inches surface cells with old rolled sheet nickel in series with cells with Electrolytic anodes The old sheet Ni anodes plate reg thick while Electrolytic anodes give 1/2 the Thickness. It looks to me as if my theory of appearance of acid & base at Cathode simultaneously was correct + not the theory of base at Cathode + acid at anode or the old theory may be ok & the anode radical may not react to dissolve Ni + prefer to give off O. yet there is no count of Ni adjacent to Cathode ??

As Nitrate of Ni always deposits the hydroxide, on Cathode it looks as if the thinner was due to deposit of Metallic hydrox & SO_3 at moment of release of Ni turned round & dissolved the $Ni(OH)_2$ thus making it thinner, or the free acid in Electrolyte - of no free acid deposit tend to have $Ni(OH)_2$ on it —

Jany 2 1920

We have thus far taken from the

Cell containing 1500 cc $NiSO_4$

~~of Nickel~~ & 60 grms Nickel Acetate

Using rolled sheet Ni - 2 plates Each weighing 275 grams without changing solution in any way Except addition of water - plating is good - will continue plating to see how long it will last

No 1	274
2	267
3	
4	

4 = OK mod thick
5 Sieve
6 Sieve
7 OK - mod thick
8 OK "
9 OK "

Co

2 Hours 300 ma

536 - 2 Crystals N.S.04 -
using 3 Electrolytic anodes
connected together -
300 ma 2 Hours

1 all Cracked up but nearly strips, 12 breaks
2 OK flat no holes - Thick
3 2 Cor Sieve -
4 3 Cor up OK thick
5 OK some sieve
6 OK fairly thick
7 Sieve fairly thick -
8 Semi Sieve fairly thick
9 OK "
10 OK "
11 Sieve "
12 OK "
13 OK "
14 OK 2 cor - thick
15 8/10 stripped "
16 8/10 " Curls
16 OK flat. semi thick
17 OK " Thick
18 OK " "
19 OK " "
20 OK " semi thick
21 OK " "
22 OK " "

Put up the Electrolytic anode with new sol
2 crystals -
1 = Cracked a little, nearly OK
2 OK - 3 Cor small - thick
3 Sieve

2 Hours

31 — ok —
32 ok
33 ok
34 ok

4 Hours 300 Ma

35 ok nearly flat. 2 Cor up 1 big
36 ok " 1 small
37 ok " 2 Cor
38 ok 2 Cor 1 very large blister
39 self peeled, blistered Thick
40 Blistered 2 Cors
41 OK 2 Cor flat
42 OK 2 cor thick
43 ok —
44 ok 2 thick
45 ok 3 Cor up "
46 ok 3 Cors - points -
47 OK —
48 Sieve - points + dirty
49 OK 2 Cors "
50 ok "
51 OK 2 Cor 1 big
52 Edges cracked 3 Cor - bad
53 OK 2 Cors
54 ok 1 Cor
55 OK 1 "
56 ok Sieve 1 Cor
57 OK 4 Cor

537 - 250 cc 2 Grust No. 504 used
12 cc H_2SO_4 used then the
whole was completely neutralized
with $Mg(OH)_2$ 2 Hours 300 Ma

1 = All Cracked up
2 bottom Sieve Edges up slight
3 2 Cor up OK thick
4 — 1 Cor big thick
5 2 " thick not flat
6 Sieve
7 "
8 OK Sieve
9 Sieve
10 OK 2 Edges
11 OK 2 " blister
12 OK —
13 OK
14 OK — thick flat -
15 OK thick " 1 Cor
16 OK 2 big edges - not quite flat
17 OK flat Sieve thick
18 OK
19 OK flat thick
20 OK "
21 OK " fairly thick
22 OK - blister thick
23 Sieve
24 OK — mod thick
25 OK 1 Cor up.
26 OK 2 Cor up - thick
27 OK
28 Sieve
29 OK
30 OK —

24 1/2 stripped - Sieve
25 OK thin -
26 OK mod thin
27 OK thin -
28 OK Thin
29 OK but holes Thin
30 OK thin -

Co

5 holes more using larger beaker

538 - 250 cc NiSoy (2 Grpt)
12 cc H_2SO_4 - using up Electro anodes

1 66° Tohi - only a blush of Ni
2 only a blush
3 blush dark
4 "
5 blush -
~~Now put in 2 cc acetic~~
6 = Very much improved Cant strip yet
8 Next time will put 2 cc acetic in -
9 has acetic - OK but cant strip bright
10 Cant strip -
11 "
12 - 10 grms acetate Nickel in -
12 only strips a few pieces Thin -
13 on verge of stripping V thin
14 Cant strip yet
15 1/2 stripped,
16 8/10 "
17 " "
18 cant strip -
19 " "
20 1/2 "
21 1/2 "
22 9/10 " Cracks Thin
23 9/10 " thin

539 2 Cryst NaOH 250cc Electrolytic
Anode run thru Hydrogen

1 Cracked up - Stripped, thick
2 OK fine, thick
3 OK fairly thick
4 OK perfect, not 1/2 thick of 540 -
5 OK " "
6 OK 1/2 thickness
7 Cant strip Leaves -
8 OK Thin
9 OK "
10 OK "
11 Sieve
12 Semi Sieve V - thin
14 " V thin
15 - OK V "
16 Sieve thin V - Curls

CO

300 ma 2 Hours

540 2 Coupt Nibor - Electrolytic
Anode heated in air to full red

1st Stripped - Cracked up some
2 OK - Very thick - 10 Cos flat
3 OK - 2 cos + ridge at Edge Very thick flat
4 OK 2 cos + front Edge flat - Very thick
5 OK — V Thick
6 OK flat - Very thick thickest off all
7 OK flat Reg-thick —
8 OK " "
9 OK " about "
10 OK — "
11 OK — "
12 OK but holes Thin
13 Sieve
14 OK V thin
15 OK V thin
16 Sieve most thin
17 OK full holes

126 — OK
127 OK 1 cor
128 OK
129 OK
130 OK
130 OK
131 OK
132 OK
131 OK
132 OK
133 OK
134 OK
135 Bad
136 Bad
137 Bad
138 Bright Cant peel
139 Bad
140 Bad
141 OK. pouch
142 OK OK — pinhole
143 OK — No pouch
144 OK 1 Cor | Varnish dried over hot plate. No Nibs probably 8/4 dedut Epoxi & alk
145 OK —
146 OK
147 OK —
148 OK
149 OK
150 OK 2 cor
151 OK

151 ok — good
152 ok "
153 ok "
154 ok "
159 ok "

52D Continued 2 Hours

100 Run OK —
102 OK — Congo papers turns blue not strong
103 OK
104 OK
105 OK

4 Hours 300 MA.

106 — OK nearly flat, few points, 2 Cor
107 OK flat
108 OK "
109 OK " Thick
110 OK " Thick
111 OK " "
112 OK " "
113 OK " " 1 Cor faint
114 OK " " 1 cor "
115 OK
116 OK 3 cor up Top & bottom
117 OK Thick — points — darkish Top
118 Sieve
119 OK
120 — All Crack dark awful —
120 run to unfiltered solution
121 all black & cracked
122 absolutely black all there — brittle —
123 Green no metal
124 all metal but awful cracked
125 " " " " improving
126 OK — 90
128 OK — 90

521 2 Hours

100" Run OK
101 OK
102 OK – Congo paper Lumo blue not strong
103 OK
104 OK
105 Sieve

4 Hours 300 Ma

106 Sieve on music, nearly flat 1 Cor
107 OK – flat.
108 OK "
109 OK " thick
110 Sieve " thick
111 OK "
112 OK "
113 OK "
114 OK "
115 OK "
116 OK "
117 OK "
118 OK "
119 OK – filtered solution
120 OK "
121 OK 2 Corns of standing gel blue at top in small place.
122 Black underneath, Grisewon faces
123 OK 2 Cor repo
124 OK again
125 OK " 1 cor
126 OK
127 OK
128 OK

129 –
130 OK
131 OK
132 OK
133 OK
134 OK
135 Bad –
136 Bad
137 Bad
138 OK
139 dark
140 Bad
141 1/5 bad bal OK
142 all black agido –
143 Top green balance OK.
144 OK 1 Cor } Cooked Varnish over Steam Bath –
145 OK 1 Cor }
146 OK
147 OK
148 OK
149 OK
150 OK 2 Cor
151 OK
152 OK 1 Cor bug
153 OK
154 OK
159 OK –

glucomum

523 — Continued

89	Run	Sieve	
90	"	OK	
91	"	OK	few holes
92	"	OK	
93		Sieve	
94		OK	

4 Hours 300 MA

95	OK	flat small sieve	10 Grams
96	OK	nearly flat	—
97	OK	"	Hmm than 520
98	OK	flat	"
99	OK		"
100	OK	nearly flat	— "
101	OK	flat	
102	OK	nearly flat	"
103	OK		
104	OK		"
105	OK		"
106	OK		
107	Sieve		
108	OK		
109	Sieve	— from filtered solution	
110	OK	—	"
111	OK	—	
112	Sieve		
113	OK	— powder	
114	OK		
115	OK		
116	OK	2 cm	
117	OK	2 cm Top	

Note = Our 6X8 001 metal sheet which is tough was sent over to be run thru Hydrogen weld pots at O'Bat it came out much more brittle than glass — Must be something wrong with their hydrogen
Jany 14 1920 Notified & sent samples to O'Bar

Note — for last 2 months I find we have been using CuO from Silver Lake full of Zinc —

Also with CuO + 8% Dried Sulphate + 6cc 20% NaOH on baking at 1300–7 Alleges — Lots of sulfate Copper dissolved out in water when discs are immersed in Hot water + find it $CuSO_4$ —

Up to This time Jany 12 1920
Regular Commercial Sulphate
of Nickel & Recrystalized Twice
+ using rolled sheet Nickel
anodes, with or without 1 cc
glacial acetic acid, when
the solution of $NiSO_4$ is
saturated + operated at
Room temperatures approx
72 Fahr, water added from
time to time to allow for
evaporation will plate out
good soft nickel sheet
1 inch wide + 2 inches long
such nickel sheet withstanding
more than 15 sharp bends before
cracking. The time being
2 hours at 300 Milamperes
approx 3. Volts,
The Cell Contains 250 cc of
$NiSO_4$ — 100 sheets amounts
to 30 grms of Nickel
The liquor is quite acid even
when no acid (acetic) originally
added. It is unnecessary
to use acetic acid or acetate of
Nickel. But

It is necessary to use $NiOH_2$ Made from double Crystalized $NiSO_4$ in neutralizing Excess of acid although we have not reached that point with 30 grms Metallic Nickel taken from the 250 cc Sol=

Electrolytic Anodes alone or annealed in Hydrogen or brought to red heat in air give only ½ the deposit as Rolled sheet Anodes and increased Surface Even to the Extent of 4 times the rolled surface makes any difference

There is something that is strange in this connection If we have saturated double Crystln $NiSO_4$ 250 cc putting in a rolled anode gives a thick deposit the first time whereas if an Electrolytic is put in the deposit isn't 1/3 as

the thickness altho there is plenty of Ni ions close to the Cathode & also when both rolled & Electro anodes are far apart.

I sometimes think that $NiSO_4$ in the presence of a free SO_3 radical. Combines to a persulfate of Ni & does no harm but if free H_2SO_4 is put in the plating is impossible. The acidity we get may be due to the persulphate & not free H_2SO_4 If this is so it will Explain why in 520 with pure $NiSO_4$ after 100 platings & very acid it is OK & will continue so probably until all the $NiSO_4$ not formed at anode is made persulfate or somehow its a puzzle —

Congo paper shows blue not strong in Electrolyte of 520 after 100 platings so if free H_2SO_4 or persulfate plating is OK

To Ni wire 3/8 immersion in solution of conc NiSO4 — 3 6 8 Hot Acid Rate deposit full of round Cavities due to bubbles clinging at 10 + 12 rate there is large warts but no Cavities because gassing is so strong they grow large + detach at certain point + permits plating This is a new one on me

Heating Electrolyte would of course expand the bubbles they would detach at smaller diameter + thus improve the plating

Again if sol was lowered in Viscosity. the bubbles would be still smaller

test

The jars we are using for leaching the
CuO discs in Hold 450 cc
McChesney say 1 Liter dissolves OK
175 grams of Zinc — ~~The~~
5.7 cc per gram
Above Cell showed dissolve 79 grams

541– Double Cryst. but one Cryst was done in Lead (old) pan

2 Hours

1 – Cracked
2 Improved
3 nearly OK
4 OK —
5 OK

6 OK 3 Hours flat.
7 OK "
8 OK "
9 OK "
10 OK "
11 Sieve
12 ?
13 OK
14 OK
15 lifted at top end 3/4 across holes
16 OK

81 — Dark-Very brittle
82 " " "
83 " " " improving
84 " " " not improving
83 " " "
84 " " "
86 " " Very bad
87
88
89 All bad —
90
94 Bad by improving
95
96 Bad
97
98
99
100
102
103
103
10
108 Bad

Continued

3 Hours 300 Ma

531
62 — OK Clear
63 OK
64 OK Clear
65 OK "
66 OK "
67 OK "
68 OK —
69 OK — from filtered Solution
70 OK 1 hole "
71 OK 2 Cons
72 OK 2 Cons
73 OK
74 OK
75 OK —
76 OK —
77 OK —

1 Hour

78 All brittle Cant strip
think it had feco grms
of Na Sulfite — yes
the Sulphite is in — its not cracked
but just brittle,
79 — all metal but dark — Cant
strip powders up
80 — Improving but powdery & brown

26 — big holes
27 ok
28 ok
29 ok
30 ok
32 — ok
33 ok
34 ok
35 ok
36 ok
37 ok
38 ok
39 ok
40 ok
41 ok
42 ok few holes
43 ok
44
45
46
47 ok
48
49

1 amp 1 Hour

50 — ok.

ok 6 hours. 1 amp. Rough
not Crystalline Nuts
Now add — 12 gms SO_4

542 COPPER
2" Strip ½ amperes 1 Hour

542 - 250cc Reg Comcl Cu SO_4
Sp.gr 1.176 - 1cc 20% H_2SO_4

1 ok turns a little no holes, sticks a little
2 ok " " Dont stick
3 ok " " "
4 ok " " "
5 ok " " "
6 ok no work 1 hole - off hard
6 ok no holes
7 ok "
8 ok "
9 ok "
10 ok
11 ok 1 hole
12 ok no hole
13 ok "
14 ok "
15 ok "
16 ok "
17 ok "
18 ok
19 ok "
20 ok
21 ok
22 ok
24 ok
25 ok

31 — ok
32 ok
33 ok
34 ok
35 ok
36 ok
37 ok
38 ok
39 ok
41 ok
42 ok
43 ok
44 - 5 6 ok
47 ok

1 amp 1/2 Hour

50 ok —

6 Hours ok, Crystals, rough
some nubs, but few & small
now add 16 grms $ZnSO_4$

Put in 12 grms $ZnSO_4$
40 hours — aerofil nubs: some
1 Cryst = Cryst,

543 Copper 1/2 amp 2"
1 Hour
250 cc Cuboy - 2nd Crystal Sp g 1174
1 cc H_2SO_4 - 20%

1 ok. Curled some, few holes Clings some
2 ok " " "
3 Sieve
4 Sieve
5 Sieve
6 ok no warts
6" ok no holes
7 ok "
8 ok 1 hole
9 ok no hole
10 ok "
11 ok "
12 ok "
13 ok "
14 ok "
15 ok "
17 ok
18 ok "
19 ok "
20 Sieve "
21 ok
24 ok "
25 ok "
26 ok "
27 ok "
28
29 ok
30 ok

22 OK
23 OK } soft
24 OK
25 OK
26 OK
27 OK
28 OK
29 OK
30 OK
31 OK
32 OK
33 OK
34 OK
35 OK
36 OK
37 Sieve - OK
38 OK
39 OK
40. Sieve
41 To 47 OK

1 amp 1/2 hour

48 — OK

6 Hours 1 amp
Crystalline - No Nuts
Rough (e) large Crystals
Now add 20 grms $ZnSO_4$
40 hours all nuts
12 hours Best of all thick + fourly Smooth

1 Hour 1/2 amp on 2" Copper
544 = 250 cc 3rd Crystal SG 1.175 1 cc 20% H_2SO_4
1 Hour
1 Cant strip brittle -
2 " " "
3 " " "
4 " " "
Co fa white -
5 Cant strip -
6 Cant strip Brittle.
7 1/10th strip "
8 1/10 "
9 2/10
10 - 3/10 Cu tough but stretches
11 OK but many holes Stringy flexible and soft
Phenomenon Copper strip soft as Gold
without trace of Electroplating -
just like Lead foil —
It dont make best 10 sharp breaks
12 OK less number of holes
13 OK 1 hole
14 OK no hole soft like lead foil. Stringy OK
15 OK " good surface underneath
17 OK " "
18 OK " "
19 OK " Thin
20 OK 1 hole
21 OK
22

Note - Jany 22 1920

The iron pocket grids when put in 1% Solution of H_2SO_4 for 10 minutes & then brushed with fibre (stiff) brush become perfectly bright & satisfactory

This sol will not attack the Nickel Scratch brush should be vigerous to wipe out low rough metal cavities which are only seen in microscope.

Each batch should be made up or taken from a Tank, say 100 grids - 10 min, then fresh solution used grids should rotate in the solution on a holder Holder taken out & carefully rinsed in Water.

Then brush as quick as possible. Rinse again & dry in probably sawdust quickly

Then they will not rust for an indefinite time

Every 2% H_2SO_4 cooled as used without damper –

545 250 $CuSO_4$ Correct 2 grms $ZnSO_4$
then 1 cc 20% H_2SO_4

1 OK ——
2 OK Knocker than 546 & 547 Warty
3 OK no knock

CO

25 — ok
26 — ok
27 ok
28 ok
29 ok
30 to 36 ok

1 amp 1/2 hour

37 — ok.

ok 6 hours 1 amp —
not crystalline, some nubs

Thick after 40 hours 1 amp
+ very few nubs even around edges
has few crystals —

Copper 1/2 amp - 1 hour

546 - 250 Cond $CuSO_4$
- 4 grams $ZnSO_4$ | cc 20%
K_2SO_4

1 ok not a hole.
2 ok " Wavy
3 ok "
4 ok "
5 ok "
6 ok "
7 ok "
8 ok "
9 ok "
10 ok "
11 ok " Comes off easy
12 ok "
13 ok "
14 ok "
15 ok "
16 ok "
17
18 ok "
19 ok "
20 ok "
21 ok "
22 ok "
23 ok "
24 ok "

28 — ok
29 ok
30 ok
31 ok
32 ok
33 ok
34 ok thin
35 ok
36 ok
37 ok
38 ok
39 ok
40 ok holes
to 46

1 amp 1/2 hours

47 — ok

6 hours 1 amp —
Shade Crystals considerable
Number fine Nubs
of 542-3-4-6 & 7
547 best no crystals or warts
546 next best.

40 hours 1 amp some bases at
Edge but face nearly
smooth — good

Copper 1/2 amp 1 hour

547 250 cc Comal CuSO4
8 grams ZnSO4 — 1 cc 20% H2SO4

1 = ok - 1 hole
2 ok no holes warty
3 ok "
4 ok "
5 ok "
6 ok "
7 ok 1 hole
8 ok no holes
9 ok "
10 ok "
11 ok "
12 ok "
13 ok "
14 ok "
15 ok holes
16 ok no holes
17 ok "
18 ok 2 thin
19 ok ~~ok~~
20 Sieve
21 ok
22 ok
23 ok
24 ok
25 ok
26 ok
27 ok

549 240CC 2nd Crystal Using
Electrolytic anode & OH heated in
pure hydrogen & OK by L OH -
4 Hours 300 MG

1 – Edges cracked & partially peeled
2 OK 3 holes thin –
3 OK thin –
4 OK thin
5 OK "
6 OK part chick "

CD

550 238 cc $NiSO_4$
300 ma · 1 Hour

1 — all cracked
2 OK 4 Corr 15 bends
3 OK ——— 12 bends

$NiSO_4$ made, Concd $NiSO_4$ in City water added about 2.0 grms Copperas — Oxidized with BaO_2 precipitd about 5% of the Nickel — all of the Iron with BaO_2 (ordinary $Ba(OH)_2$ Settled & poured thru filter. —

551 - 3rd Crystln Cutboy - Nickel anode
300 ma, 1 hour

1 = Count strips brittle,
2 Count " "
3 Count " "
4 " " "

552 3rd Crystal Mi 504 —
Copper Anode - 4 Hours 1/2 amp

1 Horrible mix cracked Ni over
thin mush Copper — Cu 1" at bottom
2 all Copper Spongy

CD